

Claims

- [c1] 1. An RF coil assembly comprising:
 - a pair of RF coils movable with respect to one another;
 - a first inductor assembly in series with one RF coil;
 - a second inductor assembly in series with the other RF coil; and

wherein the inductor assemblies are configured to have a mutual inductance opposite in polarity and substantially equal in magnitude to a mutual inductance of the pair of RF coils.
- [c2] 2. The RF coil assembly of claim 1 wherein the inductor assemblies are configured to cancel the mutual inductance of the pair of RF coils with varying relative position of the pair of RF coils as long as the first and second inductor assemblies overlap.
- [c3] 3. The RF coil assembly of claim 2 wherein the RF coils in the pair of RF coils are movable along at least one of an x-axis, a y-axis, and a z-axis.
- [c4] 4. The RF coil assembly of claim 3 wherein the RF coils in the pair of RF coils are rotatable about an axis of rotation.

- [c5] 5. The RF coil assembly of claim 3 wherein the RF coils in the pair of RF coils are translatable along an imaging plane.
- [c6] 6. The RF coil assembly of claim 1 wherein the inductor assemblies collectively have a mutual inductance opposite in phase to that of the pair of RF coils.
- [c7] 7. The RF coil assembly of claim 1 wherein the mutual inductance of the inductor assemblies varies with RF coil positioning in a manner to cancel the mutual inductance of the pair of RF coils.
- [c8] 8. The RF coil assembly of claim 7 wherein the mutual inductance of the indicator assemblies decreases as a distance between the pair of RF coils increases and increases as the distance between the pair of RF coils decreases.
- [c9] 9. The RF coil assembly of claim 1 wherein the inductance of the inductor assemblies is such that coupling of the pair of RF coils is reduced regardless of coil position.
- [c10] 10. An MRI apparatus comprising:
 - a magnetic resonance imaging (MRI) system having a plurality of gradient coils positioned about a bore of a magnet to impress a polarizing magnetic field and an RF

transceiver system and an RF switch controlled by a pulse module to transmit RF signals to an RF coil assembly to acquire MR images, the RF coil assembly comprising:

a first moveable coil loop;
a second moveable coil loop;
a mutual inductance compensation circuit connected to the first and the second moveable coil loops; and wherein the compensation circuit is constructed to generate an inductance that minimizes a coupling of the first and the second coil loops independent of coil loop position relative to one another.

- [c11] 11. The MRI apparatus of claim 10 wherein the mutual inductance compensation circuit is constructed such that the generated inductance is opposite in polarity and substantially equal in magnitude to mutual inductance of the first and second coil loops.
- [c12] 12. The MRI apparatus of claim 11 wherein the inductance generated by the mutual inductance compensation circuit varies with position of the first moveable coil loop and the second moveable coil loop relative to one another.
- [c13] 13. The MRI apparatus of claim 10 wherein the first moveable coil loop and the second moveable cool loop

are movable with respect to each other along at least one of an x-axis, a y-axis, and a z-axis.

- [c14] 14. The MRI apparatus of claim 13 wherein at least one of the first moveable coil loop and the second moveable coil loop is rotatable about an axis of rotation.
- [c15] 15. The MRI apparatus of claim 14 wherein the mutual inductance compensation circuit is constructed to increase the inductance generated as a relative angle of the first moveable coil to the second moveable coil increases in magnitude.
- [c16] 16. The MRI apparatus of claim 10 wherein the first moveable coil loop and the second moveable coil loop collectively form a coil for acquiring MR data of a region of a patient.
- [c17] 17. The MRI apparatus of claim 10 wherein the mutual inductance compensation circuit includes a first inductor in series with the first moveable coil loop and a second inductor in series with the second moveable coil loop.
- [c18] 18. A method of manufacturing an RF coil assembly comprising the steps of:
connecting a first inductor assembly in series with a first RF coil;
connecting a second inductor assembly in series with a

second RF coil; and
calibrating the first inductor assembly and the second inductor assembly such that a mutual inductance therebetween substantially isolates the first and the second RF coils independent of coil position relative to one another.

- [c19] 19. The method of claim 18 wherein the mutual inductance of the first and the second inductor assemblies is opposite in polarity and substantially equal in magnitude to a mutual inductance of the first and the second RF coils.
- [c20] 20. The method of claim 18 further comprising the step of constructing the first and the second RF coils in parallel with one another.
- [c21] 21. The method of claim 20 further comprising the step of constructing the inductor assemblies such that the mutual inductance therebetween decreases as a distance between the first RF coil and the second RF coil increases, and such that the mutual inductance therebetween increases as the distance between the first RF coil and the second RF coil decreases.
- [c22] 22. The method of claim 18 further comprising the step of constructing the first and the second RF coils to rotate relative to one another about an axis of rotation.

[c23] 23. The method of claim 22 further comprising the step of constructing the inductor assemblies such that the mutual inductance therebetween increases as a relative angle between the first RF coil and the second RF coil increases, and such that the mutual inductance therebetween decreases as the relative angle between the first RF coil and the second RF coil decreases.